

Flight, December 9, 1911.

FLIGHT

First Aero Weekly in the World.

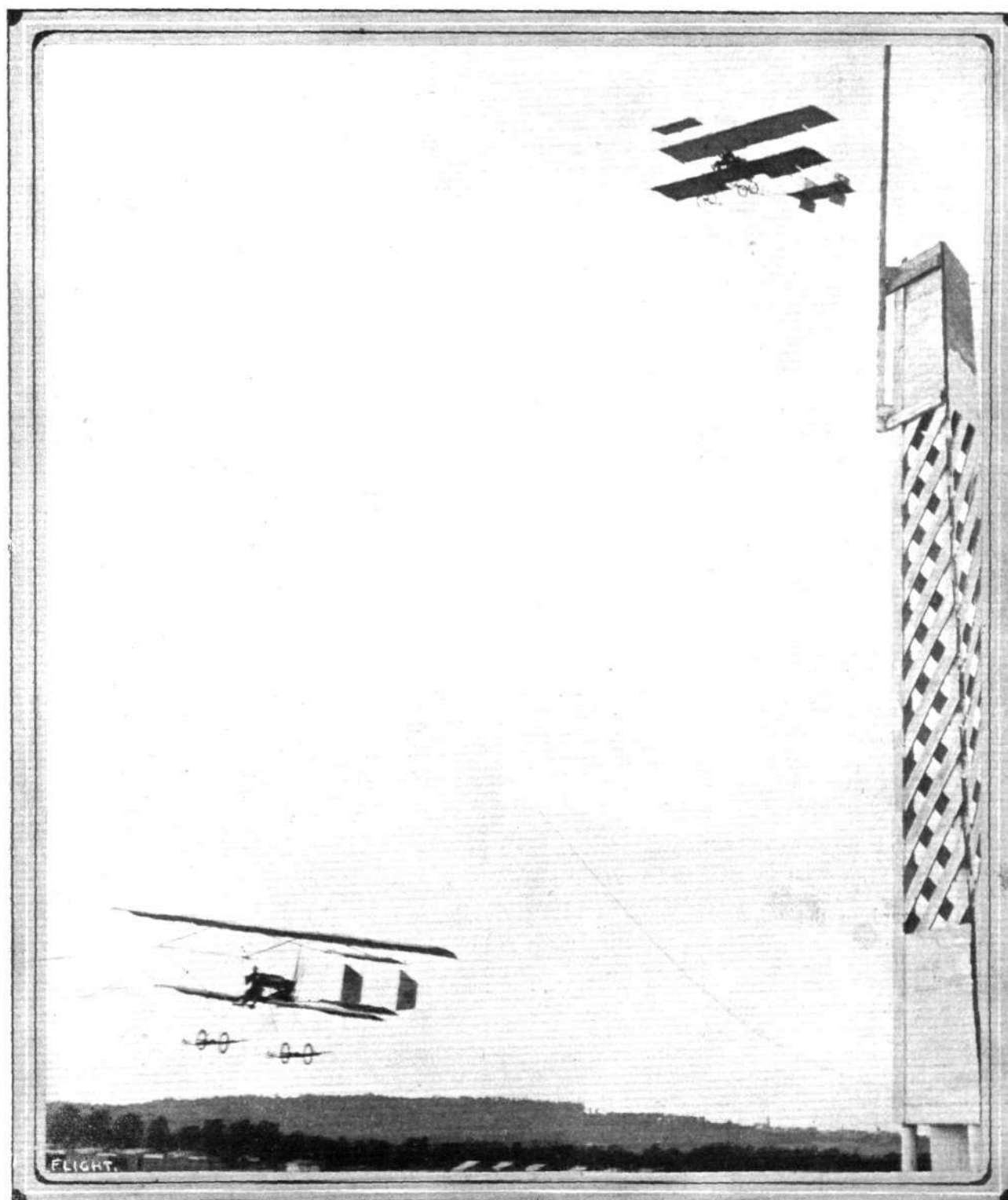
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Weyman, the great pilot of the Nieuport monoplane, in the earlier days was a biplane pilot. Our photograph above shows him and Tetard each on a Henry Farman machine rounding a mark tower during a race meeting. B 2

EDITORIAL COMMENT.

The Government and the Industry.

Viewed from a dispassionate standpoint, Col. Seely's reply to the deputation who waited upon him, on Tuesday, in the interests of the British aeroplane industry, may be regarded as, on the whole, satisfactory.

On the question of the competition, which the War Office intends to hold next summer, Col. Seely was quite obdurate on the question of its necessity, and therein we agree that the official attitude is entirely correct, up to a point. In the race for aerial supremacy we cannot allow sentiment to weigh for a single instant. It would be in the highest degree unsatisfactory, and, indeed, an exceedingly dangerous thing for the British Government to be too insular in any matters affecting national defence. Our armaments must be the very best that science can devise, no matter whether it be our Navy, our Army, or our Aerial Forces; and to that end it would be folly of the worst description for the War Office to restrict itself in any way in the search for what is best in aerial craft or weapons. Therefore, we think it may be agreed that the principle of throwing open the competition to the machines of the whole world is essentially sound. Beyond that, Col. Seely gave the definite assurance that the Government regarded the aeroplane in the same way as other ordnance, and said, categorically, that whatever machines were required would necessarily have to be built in this country. It has been tacitly understood that this would be so, but, so far as our recollection serves us, we have never had any closely-defined statement of precisely how the aeroplane is regarded, and it is good to have this statement on record, for if it means anything at all it means that there must arise a British industry on some sort of basis of Government support. At the same time, Col. Seely's warning that it will not do for the industry to expect to subsist entirely on Government orders must be kept well in mind.

At the moment, we can none of use foresee to what ultimate importance aerial armaments may achieve, and, therefore, it is quite impossible to predict to what size the business of supplying the Navy and Army with aeroplanes may grow, but if the lessons of other industries are worth anything at all, we may assume at once that Government orders will never suffice to maintain the trade. As a matter of fact, that is not what the industry has been asking. All that is required is something of the measure of support which has been given to the industries of Continental countries by their respective Governments. Given that, we think that our own constructors will be found to be quite capable of holding their own in the best of company.

Now, with regard to the question of the giving of conditional orders, prior to the holding of the competition, which we have from time to time advocated with all the energy at our command. Taking Col. Seely's reply on the point as it stands, and with due regard to his official position, we are inclined to view it as being satisfactory to the trade, provided things work out as we believe they will.

In the light of the reply in question, what seems likely to happen is this. When the conditions of the official competition are issued—as they are to be in a fortnight's time—we are confident it will be found

that the Government will undertake to purchase such British machines taking part in the trials which prove successful in passing a certain standard. This may not be quite the same as placing with firms orders for delivery on a certain date, subject to test, but the difference is so slight as to make very little odds.

Quite naturally, Col. Seely did not commit himself to any definite statement of the number of machines that will ultimately be required by the War Office. That is a question of policy which can only be disclosed and discussed at the proper time. But he did go so far as to confirm his previous statement, made in the House of Commons, that provision was being made for a hundred officers to learn to fly, and added that an adequate number of aeroplanes would be required for them. That is something to go on with, and in the meantime we can only possess our souls in patience and await the issue of the rules which are to govern the War Office trials in June—as at present suggested—of next year. Fortunately, we have only a couple of weeks to wait for that, so that the policy of "wait and see" will not be unduly irksome. Until then we may reasonably suspend passing judgment upon the Government policy as a whole.

A Chance for Mr. Winston Churchill.

Since his translation to the Admiralty, Mr. Winston Churchill has given so much evidence of his thoroughness and sincerity in the best interests of our naval supremacy that we would urgently point out to him the importance of without delay putting the Navy into a position of strength in respect of aeroplanes. There need be no wild plunging, but an immediate start is badly wanted.

Col. Seely told Tuesday's deputation that Mr. Churchill was in fact giving earnest attention to the subject and we have no doubt but that in time some sort of pronouncement will be made. The point is that all this consideration as to needs and types spells delay which it is eminently desirable to avoid. At the moment what is wanted is an announcement of broad principles.

Hitherto the Navy has been associated with the dirigible almost solely—certainly officially—and it does seem to us that it would be more than useful if it were made known that the Admiralty were prepared to purchase a nucleus number of machines at some reasonable price to be named, subject to their compliance with certain specified tests. Let these latter be of a character that manufacturers can be expected to reasonably comply with, and development would speedily follow. Later on—in a few months, probably,—the acceptance tests could be advanced in severity, and we should thus get progressive development, which would, before long, place the Navy in the same supreme position in the air that it now occupies on the seas. The new First Lord is, above all, a worker and a far-seeing personality. Here is a chance which would give him a place in history, as being the first head of any navy to properly grasp the possibilities of the aeroplane as an auxiliary to battle-fleets, and who, above all, placed Great Britain in a position of unquestioned supremacy at sea and in the air. As we remarked last week, "Do it Now" is an excellent motto.

2 negatives
FLIGHT PIONEERS. *Deperdussin*



MESSRS. D. LAWRENCE SANTONI and LIEUT. J. CYRIL PORTE, R.N.,
Two pilots who are the first to establish and operate a British factory for a foreign aeroplane, viz., the Deperdussin.

A Study of Bird Flight

By Dr. E. H. Hankin, M.A. D.Sc.
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CHAPTER XXXVIII.—The Position of the Centre of Gravity under different Conditions of Flight.

THE outer third of the wing of a vulture consists of the wing tips. The inner two-thirds of the wing are cambered (when the wing is extended), and are concerned with lifting effort in unsoarable air and with lifting and tractive effort in soarable air. The centre of lifting and tractive effort of each wing may therefore be taken as being near the junction of its inner and middle thirds. The wing sections shown in the following figures may be regarded as taken at this point.

The following diagram (Fig. 57) represents a side view of a vulture when gliding in a straight line in soarable air.

It will be seen that the position of the centre of effort of the wings is vertically above the centre of gravity. Supposing the vulture advances its wings, thus (Fig. 58), then a couple is produced tending to rotate the bird upwards round its transverse axis. Such rotation, as we have seen, actually occurs. The bird rotates until it assumes the following position (Fig. 59).

Thus the centre of lifting effort re-acquires its position vertically above the centre of gravity. Conversely if the bird retires its wings, a couple originates that rotates the bird in the opposite

direction, thus (Fig. 60), and again the centre of effort is vertically above the centre of gravity (Fig. 61).

Therefore, so long as the bird is gliding in a straight line in unsoarable air, the centre of effort of the wings is vertically above the centre of gravity. If the centre of effort is displaced, rotation round the transverse axis at once occurs until the centre of effort is again vertically above the centre of gravity. We have already seen that when a bird is gliding in an ascending current the same law holds. Under these conditions the centre of effort is near the centre of area of the wing, and in order to retain gliding horizontally the bird advances its wings until the lift is again vertically above the weight.

Does the same relation hold when the bird is subjected to a propelling force, as in flapping flight or when soaring?

Let us first consider the case of flapping flight. We have already seen that if the bird while flapping changes its wings from the "straight" to the "retired" position, it rotates round its transverse axis, and the direction of its flight is in a downward direction. Conversely, if, as in stop flapping, the bird advances its wings it rotates upwards round the transverse axis. These facts suggest that the law holds

good. But if this is the case, why is it that the wings are advanced in slow horizontal flight, and why does the amount of advancing diminish as speed increases?

Supposing a bird is gliding horizontally in calm air, and someone momentarily catches hold of its tail, so as to check speed ahead. Supposing, in consequence, the bird was to flap its wings up and down in order to regain speed ahead. Then, at first, as the air strikes the surface of the wing nearly at a right angle, the "lift" is at a point near the centre of area. Hence the bird has to advance its wings in order to bring the "lift" over the "weight." Hence the wings can be seen to be advanced in slow flapping flight. But as speed ahead increases, the angle of incidence diminishes. Consequently the "lift" approaches the

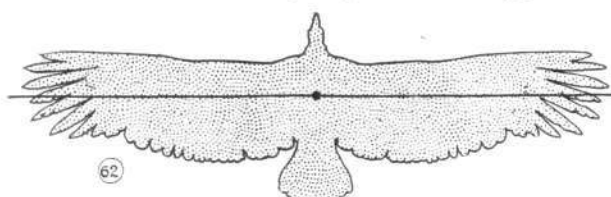


Fig. 62.—Outline of a vulture circling in air not fully soarable, or circling in fully soarable air without effort to gain height.

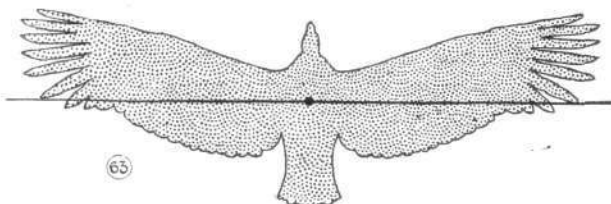


Fig. 63.—Outline of a vulture circling in fully soarable air and with effort to gain height.

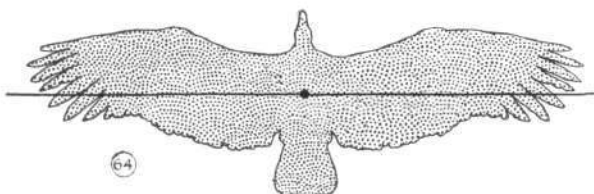


Fig. 64.—Outline of a vulture slow flex-gliding (8 metres per second).

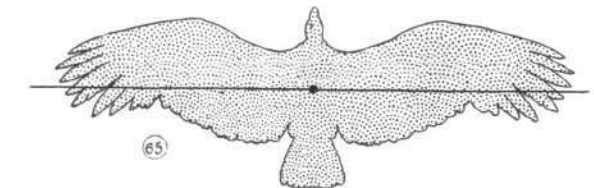


Fig. 65.—Outline of a vulture flex-gliding at medium speed (12 metres per second).

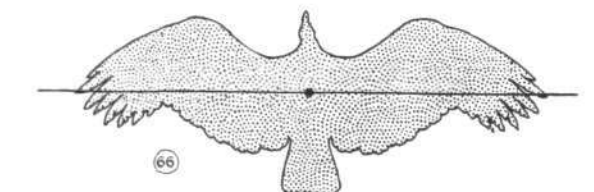


Fig. 66.—Outline of a vulture fast flex-gliding (22 metres per second).

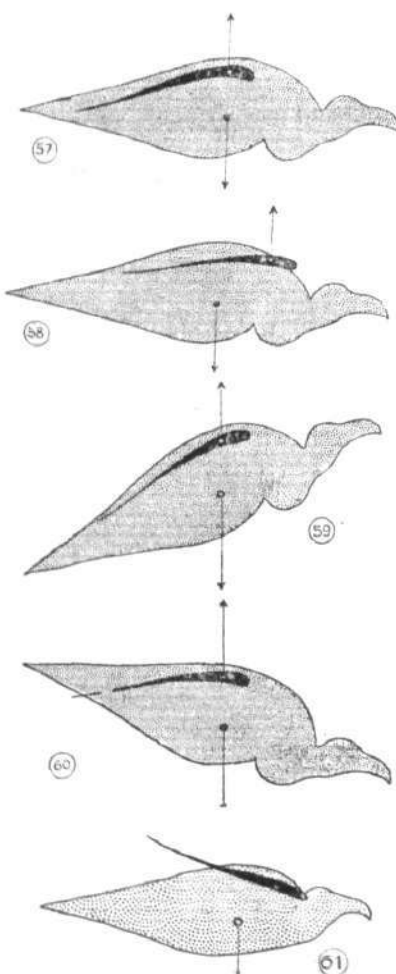


Fig. 57.—Section of a vulture gliding in unsoarable air.

Fig. 58.—Effect of advancing wings, first position.

Fig. 59.—Effect of advancing wings, second position.

Fig. 60.—Effect of retiring wings.

Fig. 61.—Section of vulture in flapping flight.

anterior margin of the wing. Therefore the wing has to be retired, in order to keep the "lift" vertically over the "weight." Hence in fast horizontal flapping flight no advancing of the wings is to be observed.

This description is only approximately correct. The force of flapping has to neutralise not only the weight but also the resistance to forward movement through the air. If a bird is in movement in the air it may be regarded as being acted on by four chief forces, namely, "lift," "weight," "pull" and "drag." In flapping flight the force exerted by the wings may be regarded as compounded of "lift" and "pull." Of these two forces the "lift" acts vertically, and the "pull" horizontally. Their resultant may be called the "total pull." It is a force acting upwards and forwards. It balances a force compounded of the "weight" and the "drag." This force, which acts downwards and backwards, may be called the "total drag."

If a bird is taking energy from the air in soaring flight it is being subjected to a propelling force. Therefore, the forces acting on it may be regarded as resulting in a "total pull" and a "total drag." By examining the position of the wings in different kinds of soaring flight we may be able to arrive at some conclusion as to the direction from which the unknown force of soarability acts.

Figs. 62 to 66 show outlines of a vulture when circling and when flex-gliding at different speeds. It will be seen that as the speed of flex-gliding increases the larger is the proportion of wing area in front of the level of the centre of gravity.

If a vulture is circling in fully soarable air with effort to gain height, its wings, besides being advanced, are placed in a dihedrally-up position, as shown in the following diagram (Fig. 67).

A further reference to this employment of the dihedrally-up position will be made when I come to discuss the functions of the wing tips.

A section of a vulture when slow flex-gliding may be represented thus (Fig. 68).

As already stated, this position is apparently identical with that assumed for gliding with speed ahead in an ascending current. In this latter case the angle of incidence is about 90°. In other words, the "total pull" acts in a direction at right angles to the surface of the wing, or nearly so. Therefore, in slow flex-gliding, the unknown force of soarability must also act in a direction approximately at right angles to the surface of the wing.

If a vulture, when slow flex-gliding, wishes to increase its speed, it slightly increases the flexure of its wings. The secondary quills are thereby relaxed, and assume the following position (Fig. 69).

Thus the wings of a fast flex-gliding vulture are disposed in a way which, if imitated by a power-driven aeroplane, would rapidly bring the machine to the earth. That the wings actually assume the position shown is a matter of comparatively easy observation. It is important to realise that the position of the surface of the wing is due to air-pressure, or more particularly by a pressure exerted by soarable air when under the vulture's wing. Flexing the wing, at the carpal-joint, results in relaxing the ligaments that hold the secondary quills in position. This relaxing of the ligaments, of itself, has no power of putting the secondary quills in their new position. It merely allows the feathers to take the position given to them by the pressure of the air. A little consideration will show that in fast flex-gliding the pressure is exerted at right angles to the surface of the wing, as is the case in slow flex-gliding. In Fig. 70, the disposition of the wing in slow flex-gliding is shown at A. The arrows represent the position and direction of the "total pull" and "total drag."

The position of affairs in fast flex-gliding is shown at C. The weight is as before. The resistance to passage through the air is

Hence in flex-gliding the faster the speed the more the wings are advanced.

Therefore there seems to be no probable alternative to the conclusion that soarable air exerts a pressure on the under side of the wing of the flex-gliding vulture. It has already been shown that there are no observational or experimental reasons for assuming the presence of ascending currents in the neighbourhood of the bird that could be invoked as an explanation of this pressure. The view that ascending currents, in the ordinary sense of the word, have to do with soarability fails completely to explain why pressure is still exerted at right angles to the surface of the wings when the latter are fully advanced and relaxed as in fast flex-gliding.

That is to say, the facts of the case in slow flex-gliding do not necessarily exclude ascending currents. But the facts of the case in fast flex-gliding furnish evidence that ascending currents are not the cause of soarability. Let us consider the case from another point of view.

Adjutant birds have an extensible pouch that hangs down from the lower part of the neck. Towards the end of the monsoon season before they leave Agra for their breeding haunts, this pouch is often extended and may reach a length of sixteen or more inches. Sometimes the pouch is seen extended while the bird is in soaring flight. It can then be seen swaying slowly to and fro in the air. Owing to its weight, and owing to the air pressure from the forward movement of the bird, the pouch, in general, hangs downwards and backwards. It shows no indication of being pressed forwards and upwards. But the air under the wing of the bird, within a few inches of the swaying pouch, is pressing the quill feathers upwards and

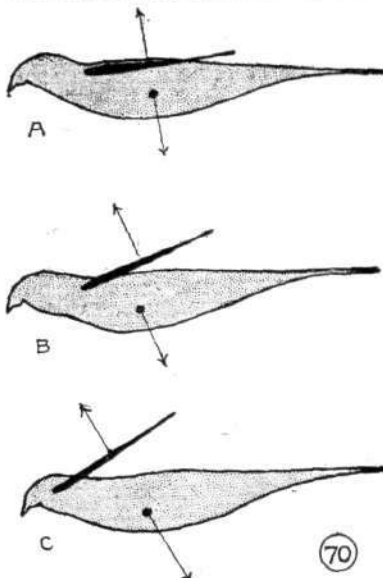


Fig. 70.—Diagram showing position of "pull" and "drag," at A in slow flex-gliding, and at C in fast flex-gliding.

"At B is shown an imaginary case in which the wings are placed in the fast flex-gliding position, except that they are not advanced. Hence between the 'pull' and the 'drag' there is a couple tending to rotate the bird round its transverse axis."

forwards with a force that not only sustains the bird but that also propels it at a speed of thirty or forty miles an hour. How could ascending currents exert this tremendous force on the wings of the bird, and yet have as little apparent action on the pouch as they have on a floating feather in its neighbourhood?

There can be no doubt that the pressure on the under side of the adjutant's wing is exerted by air in motion. The motion is in such a direction as to exert pressure at right angles to the surface. An explosion of a gas is exerted at right angles to a flat surface. Therefore air as it passes under the wing of a soaring bird must undergo some change by which energy is liberated and which in the direction of the resulting force resembles the explosion of a gas.

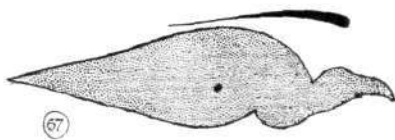


Fig. 67.—Section of a vulture circling.

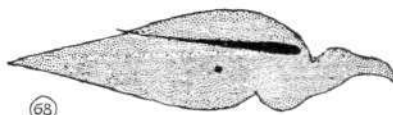


Fig. 68.—Section of a vulture slow flex-gliding.

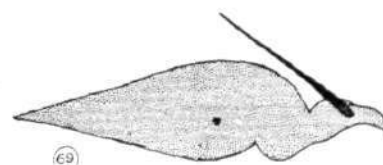


Fig. 69.—Section of a vulture fast flex-gliding.

increased owing to the increased speed. Therefore the "total drag" must act in a more backward direction. Hence I have drawn the "total drag" arrow in C pointing more backwards and less downwards than in A. But the "total drag" must act in a line with the "total pull." In fast flex-gliding the wing is further advanced, as I have drawn it at C. Hence, as shown at C, the force is still exerted at right angles to the surface and at the centre of area, or thereabouts. If the bird was to increase speed merely by relaxing the secondaries, as shown at B, a couple would originate tending to cause rotation downwards round the transverse axis.

In one of the earlier chapters I pointed out that it was inconceivable that the bird could get energy out of air if air is homogeneous, unless the passage of the vulture's wing causes some change or decomposition. Obviously, as shown, air from the point of view of soarability, is, in general, homogeneous. Therefore the conclusion is inevitable that the passage of the wing causes some change or decomposition in the air. If there is decomposition or explosion there must be something in soarable air that can decompose or explode. I propose to return to the question of this unknown something in a later chapter.

(To be continued.)

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Flying Ground, Eastchurch.

SOME very good flying was witnessed at the Eastchurch aerodrome during the week, although, generally speaking, the weather has been in no way ideal for the purpose.

On Sunday, Jezzi was out on his new biplane, and made some excellent flights. Since last week he has made some further improvements in his machine, particularly in giving a deep stream-line form to the main chassis-struts, and also to the fuselage tail, which is now completely covered in, and is joined in a gradual taper from the pilot's shoulders to the tail plane, reminding one somewhat of the Breguet. Seen in flight on Sunday, the machine presented a very neat appearance, and behaved exceedingly well. Lieut. Dunne was also making straight flights during the day.

On Monday, Ogilvie was out on his N.E.C.-engined Wright biplane, making some exceedingly fine flights in a strong wind. The machine gave evidence of great climbing power, Mr. Ogilvie evidently finding no difficulty in rising, during one circuit of the aerodrome, to a height which, by careful judgment, could not have been less than 1,500 ft.

Lieut. Gregory was also flying in the afternoon, this being his first time out since his recent illness, and all were glad to see him back again. By way of showing that he had not lost any of his old flying form, he made a flight to Sheerness Harbour and back, circling round H.M.S. "Actaon" as she lay at anchor. Returning, he put in some fine practice over the aerodrome, making some exceedingly neat turning movements, banking the Short biplane he was flying in true Grahame-White fashion.

On Monday and Tuesday, Mr. S. P. Cockerell and Mr. V. A. Barrington Kennett, both of the Territorial Balloon Company, put in their first practice, under Mr. Travers' guidance, on the 70-h.p. Short biplane. Mr. Cockerell, by the way, already has his R. Ae.C. pilot certificate, and judging from his first performance at Eastchurch is cut out for a really good flyer.

Mr. Barrington Kennett had his first experience of piloting from the passenger pilot seat of the new machine, from which, by a special dual control, a pupil is able to take charge at the will of the instructor.

Brighton-Shoreham Aerodrome.

ON Sunday several well-known aviators visited this Aerodrome, the party including Mr. D. Graham Gilmour, Mr. Oscar Morrison, Mr. Radley, and Lieut. J. C. Porte, whose two-seater Deperdussin is stationed here. Lieut. Porte gave Mr. Gilmour an opportunity of trying the Deperdussin, and after a splendid exhibition off the Brighton Front, he returned in good form to the ground, and expressed himself highly delighted with the machine.

In the Chanter School good work has been done. On Wednesday last week Hamilton-Ross was doing straight flights. He managed to run into sheds on landing but without hurt. Kent and "Brown," two new Brighton pupils, put in their first rolling lesson on Thursday, and continued the practice on Friday, making good progress. Saturday saw these two pupils out again, Kent getting his tail off. On Sunday, Kent and Davey were doing short hops. Monday, De Villiers put in some rolling with tail off, and on Tuesday De Villiers and Gassler managed some straight flights.

The Chanter monoplane is waiting for her new propeller.

The local model club were doing good work here during the last week, on Saturday several machines making some splendid flights.

Brooklands Aerodrome.

WEDNESDAY last week was a busy day, owing to the perfect weather. Kemp was out first on the Vickers; then Raynham on the Green-Avro and on the Viale-Avro in turn. Lieut. Wilkins brought one of the Deperdussins down in the sewage farm, but without serious damage of any sort. Lieut. Porte was out later on the 35-h.p. Deperdussin, whilst Young and Setti did straight flights on the Green-Avro.

In the afternoon Wilkins again had a minor accident on the Deperdussin, breaking one of the front skids in landing. Both Bristols, both Avros, the Walton-Edwards, Ducrocq's Farman, the Deperdussins, the Martin-Handasyde were all in the air, several being up at one time. Snowden-Smith took the Hewlett-Blondeau racing biplane over Aldershot.

It is a pity that the public does not realise the fact that fine flying can usually be seen all day at this time of year, owing to the absence of tricky remous, which are the bugbear of summer flying.

Sopwith was flying the Martin-Handasyde, which did splendidly circuit after circuit, taking up several passengers, including Handasyde. This machine is very fast and seems to suit Sopwith, who put in some fine banked turns and *vol planés*.

Late in the afternoon Noel took out the Green-engined Avro on which Young and Setti had previously been doing straight flights,

but owing to the bad light hit the low bank round the sewage farm when about two feet from the ground. In consequence the landing chassis and the bottom planes were badly damaged. Ducrocq made his usual evening trip out over Weybridge, and Spencer, who was in the air for a long while during the afternoon with passengers, again made several excellent flights. His machine is an exceptionally fine one of its type, its chief points being that of high speed and delicacy of control. It is also apparently very stable, only a very slight, almost imperceptible, movement of the control lever being necessary.

Everyone was glad to see the return of E. V. B. Fisher, who has been resting at Margate after the effects of his smash in the Vickers. He seems quite recovered, and is anxious to start flying again.

On Thursday, Raynham was out on the Viale-Avro, Knight doing straights on the Vickers. Some excitement was caused by the arrival of Cody from Laffan's Plain soon after 4 o'clock. He came over with Lieut. Parke as passenger. The latter is now learning on the Cody machine, and has already managed a circuit on it. In spite of numerous invitations to stop for the night they decided to return, and after circling the ground set off back in the direction of Aldershot.

Weather on Friday was dull and windy. Nevertheless, Raynham was at work on the Viale-Avro, and the Walton-Edwards machine, after an engine test, made several straight flights in its usual stately manner. Capt. Beattie later took out the Vickers, rolling, and expressed himself as being pleased with the "feel" of the machine. At dusk, Lieut. Snowden-Smith returned in uniform with a large number of sappers on a lorry with the Hewlett-Blondeau, which, though dismantled, was in no way damaged. This was a surprise to most, as a statement had appeared in the morning Press that the machine was badly damaged owing to its coming down from 800 ft. through engine failure. The facts are as follows: Lieut. Snowden-Smith had to make a hurried landing, which he did in perfect safety, but owing to the smallness of the field in which he came down, thought it more expeditious to take the machine apart and bring it back to Brooklands by road.

Saturday was a bad day for flying, but was remarkable for a magnificent flight on the Martin-Handasyde by Graham Gilmour in a very high wind. Making two circuits he controlled the machine in an extraordinary manner, and though knowing of this pilot's skill, onlookers were glad to see him back to earth again. Raynham was also out making straight flights on the Avro machine, showing great steadiness.

An excellent flying day resulted on Sunday. Bristols, Spencer, Blondeau, were all out with passengers; Raynham was up on the Avro; and Kemp on the Vickers was flying strongly at 500 or 600 ft. Later, Beattie was doing straight flights on the same machine.

After lunch, two specks appeared in the sky at an altitude of about 2,000 or 3,000 ft. over in the direction of the paddock. Upon closer approach, they turned out to be Salmes, on a 50-h.p. Gnome-Blériot, and Hamel, on a military-type two-seater of the same make, accompanied by a lady passenger. The latter pilot came down with a splendid *vol plané* of alternately right and left-handed curves, and subsequently gave a fine exhibition of flying.

Monday, Wilkins was out on the school Deperdussin, but, owing to the engine not pulling well, came down again. Longcroft managed to badly smash one of the Bristols by bringing the machine from the tips of its skids on to the front elevator when at only a few feet from the ground. The machine stood on its head, causing Longcroft to strike his head rather forcibly; but there was nothing serious, as by the afternoon he was out and about. Later, Raynham took out the Avro; Spencer and Pizey were also up. Graham Gilmour again flew the Martin-Handasyde, while the Walton-Edwards made turns and straight flights in greatly improved style.

During the afternoon Kemp flew the Vickers for several circuits, and though the engine was not pulling as well as usual, the machine climbed and flew quite satisfactorily. W. D. Johnstone, who has just returned from Buc, where he had been flying at the R.E.P. school, then went for straight flights. Though one of his landings was rather bumpy, his management of the machine was distinctly good.

On Tuesday there was heavy rain in the morning at first, clearing up, however, later. Blackburn on the Walton-Edwards made several straight flights, while Raynham put in a couple of circuits on the Viale-Avro.

In the afternoon, Gordon Bell, who used to fly the Deperdussin so well, was first out on the Martin-Handasyde. Going up in the machine for the first time, he flew for twelve circuits in excellent style, without the customary preliminary of "straights." The machine was afterwards taken out by Graham Gilmour, first *solus* and later with a lady passenger. Fleming and Pizey were out on

the Bristols, Spencer with a lady passenger, Kemp and Knight on the Vickers. The Pashley Brothers have once more appeared on the scene with their repaired Humber-Blériot, and were testing the engine. On seeing the Cody biplane appear in the sky apparently coming over Addlestone, people naturally assumed that the pilot was Cody himself, but were mistaken, as it turned out to be Lieut. Parke, who had flown straight over from Laffan's Plain. He flies the machine very well, and made an absolutely perfect landing.

On Wednesday Chataway succeeded in qualifying for his ticket on the Deperdussin *brevet* machine.

Bristol School.—On Wednesday the Bristol school were busy. Pizey was out first with Longcroft, climbing 1,500 ft. in 10 minutes, and going out over the Weybridge Golf Course, with his pupil doing all the hand-control work, and finally landing in a spiral *vol plané* of three complete circuits. At the same time Gordon was up on No. 65, gaining great confidence, and reaching 500 or 600 ft. Garne then went up with Pizey and Warren with Fleming, the latter being also out again later with Longcroft for tuition, at a low level. Gordon put in some figure of 8 practice and landed right up to the mark. Major Benwell was making some good 8's and half right-hand turns, subsequently passing the first half of his certificate.

In the afternoon Pizey and Fleming took the air simultaneously, testing the respective powers of lifting of the two machines. No. 29 won easily. Gordon and Benwell out practising, Longcroft, Warren, and Garne were out with Pizey and Fleming at a high altitude. Benwell then passed the second half of his *brevet*, going up to 400 ft., and landing well as usual. Pizey afterwards took Longcroft for a spin.

On Thursday, it was rather windy, but Fleming got away with Warren and Longcroft, the latter doing all the hand-control, and practising landings. Later, Pizey carried Garne, who handles the controls very well indeed. Lane, a new pupil, followed with him, and afterwards also Longcroft.

On Friday, Garne did low straight flights, with Fleming in the passenger's seat, Warren being also out. Saturday was too windy for school work.

On Sunday, Pizey was flying with Longcroft for three circuits, and also with Capt. Weeding, a new pupil. Later, the latter's sister took the passenger's seat. Garne was flying well.

On Monday, Garne put in two smart circuits, Longcroft afterwards finishing with a nasty smash. Pizey was up in the afternoon on the remaining machine, with Capt. Raleigh, Capt. Weeding, Lane and Warren.

On Tuesday afternoon both Fleming and Pizey were doing air work.

Filey School (Blackburn Aeroplane Co.).

Oxley and Scott were out on Tuesday last week on the Renault passenger machine, making one or two short flights, but the wind being rather gusty no long flights were attempted.

Next day, Oxley, Weiss, Hunt, and Scott made several passenger flights on this machine, on one of these flights Oxley going up with a pupil as passenger to the height of 500 ft., the large monoplane climbing very quickly. The wind came again rather gusty, making lengthy flights risky.

Sunday night proved to be a beautiful moonlight night, so Oxley had the machine out at one o'clock in the morning, making many passenger flights with pupils by moonlight. The night was perfectly clear, which made flying quite as safe as during the day. They had a short rest, then they were again out flying in the early hours of Monday morning with the Renault passenger machine.

This machine has now done a considerable amount of work, and up to the present there has not been the slightest hitch with the motor or any other part of the machine.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Although the weather was by no means too clear for practical work with the machines on Wednesday of last week, Fowler took out the school Farman in the morning and practised straight flights for half-an-hour. Raphaite then took control of the machine and rolled for 20 mins. There is some satisfaction in the fact that he has at last succeeded in getting the knack of maintaining a straight course, which shows that he is overcoming the intricacies of the controls. During the remainder of the morning both these pupils continued their practice alternately. After lunch, Fowler had further practice at flying straight lines and semi-circles, and at about half-an-hour before dusk he handed the machine over to Mr. R. T. Gates, who continued practising until it was too dark for further work. Fowler was out both morning and afternoon on Monday flying the school Farman.

The unsettled weather during the week-end and previously was largely responsible for the small amount of practice that the school has to report.

Blériot School.—On Monday of last week the weather was very fine, Messrs. Potet, Welburn, and Gordon Jones making straight

lines, each showing great improvement. Messrs. Dessouter, Prentiss, Sacchi, and Allen were flying and making good progress.

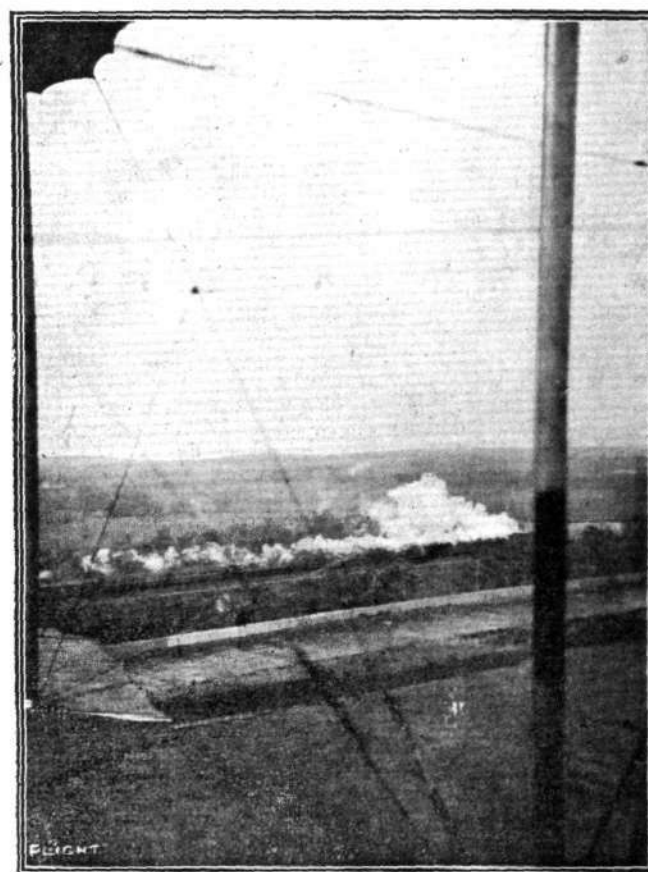
Although on Tuesday the weather was not ideal, Messrs. Morris, Potet, Prentiss, and Dessouter were at work for some time.

Wednesday was very fine again, and all pupils were out practising practically the whole day. Mr. Hamel, with his usual skill, took a lady passenger out on the Blériot military machine, making a flight of about an hour, at an altitude of between 3,000 and 4,000 ft. Mr. Salmel went up on his Blériot-type of the *Daily Mail* Circuit, fitted with a 50-h.p. Gnome engine, taking a sealed barograph with the intention of beating the English altitude record, and when he came down the barograph registered a little over 9,000 ft., the 6,000 ft. altitude being attained very rapidly. The last 3,000 ft. was a very different matter, the climbing naturally being more difficult. Mr. Salmel came down in *vol plané*, and felt quite all right after his experience. The barograph is now in the hands of the Royal Aero Club, being tested.

Thursday and Friday the weather not being very fine only a little work was done by the pupils. On Thursday, however, Mr. Seamon made two flights of about 15 minutes each, practising the *vol plané* with success at the end of each flight.

Mr. Hamel, on Sunday afternoon, carried a lady passenger on the Blériot military machine from Hendon to Brooklands against a strong wind, Mr. Salmel accompanying them on his altitude Blériot. After a stop at Brooklands for a few minutes a re-start for home was made, all being delighted with their flight. Forty-five minutes were occupied in the outward trip, and 14 minutes only on the home tack, owing to the strong head wind blowing off Brooklands.

Valkyrie School.—Wednesday of last week was an exceptionally fine day for flying after the fog dispersed. At 9.30 the school pilot took out the school machine and made several circuits, by way of ascertaining the atmospheric conditions. These preliminaries over, a busy day's flying and tuition ensued. Mr. Busk was first away, flying the school machine for twenty minutes. He is rapidly gaining mastery over the machine, his landings being particularly good. Meanwhile Mr. Barber was out on Valkyrie No. 10 carrying out all kinds of aerial manoeuvres, preparatory to giving passenger flights. Miss Loraine next mounted the passenger seat and Mr. Barber was quickly away and rose to a big height; after making excursions over the surrounding neighbourhood in every direction, he cut off his engine and landed with a clever glide in front of the hangars.



A snap from the Spencer biplane when flying at Brooklands, a L. & S.W.R. express being seen in the distance beyond the banking.

Later, Busk continued his tuition and showed further progress. Towards mid-day the wind became gusty; notwithstanding this, Capt. Loraine made a clever flight on the racer, his manipulation during bad gusts being admirable. In the afternoon conditions were ideal, and at 3.30 Mr. Barber again brought out the Gnome passenger carrier; with Miss Franklin in the passenger seat, he was quickly away for a cross-country flight. Only two circuits of the aerodrome were necessary to rise many hundred feet before leaving the flying ground, and the aviators were soon lost to sight in the direction of Harrow. This town was passed at over 1,000 ft., and the return journey begun by a wide detour in the direction of Willesden, and home over Hendon Water. While the passenger carrier was away, Ridley-Prentice ascended on the school machine. He rose to fully 800 ft., and flew round outside the aerodrome at this altitude; crossing the railway, he passed under the passenger machine, which was returning at a great height. Mr. Barber then cut off his engine, and executed a magnificent *vol plané* to earth. Ridley-Prentice continued his flight for a few more circuits, and terminated with a steep *vol piqué*, landing faultlessly.

Chambers then made a trial flight of three circuits at 200 ft., before setting out for his *brevet* tests. Captain Loraine at the same time started on a climbing expedition. He quickly rose to well over 1,000 ft., and maintained this altitude for half-an-hour. He made wide detours over Hendon and Mill Hill districts, and on returning to the aerodrome concluded his fine flight with a long spiral glide.

Chambers then made his first test flight for his *brevet*, Messrs. Metford and Slack acting as official observers. He quickly reached an altitude of between 300 and 400 ft. Apparently he was enjoying his flight immensely, for he completed six figure eights, and then, seeing that darkness would prevent him from flying his second series of figure eights, he made several very small circles, with splendid banking, before finally descending *en vol plané*. Altogether he handled his mount in very expert style.

Inclement weather prohibited any flying on the following days, but on Sunday afternoon Mr. Barber was flying his racing machine in his usual excellent style. No school work was done this day.

Salisbury Plain.

Air Battalion.—On Wednesday of last week the weather was ideal for flying, after the mist had cleared off in the early morning, and the Air Battalion was soon at work, five machines being brought out almost at once. The first to take the air was Lieut. Reynolds on a Bristol military biplane, followed by Lieut. Barrington Kennett, who had arrived on the previous day from France, where he had been learning to fly the Nieuport. He made a good trial on one of these monoplanes, and at the same time Lieut. Hinds was up on the Breguet biplane, with and without passengers, one of those carried being Staff Sergeant Wilson, R.E. Lieut. Conner also made a trip on one of the Bristol extension biplanes and the *vol plané* by which he landed at the conclusion was especially fine. Capt. Fulton had his biplane out, and made his tests for the R.Ae.C. Superior Certificate flew to Aldershot and back as mentioned in our last issue. He left Salisbury at 12.10 and reached Aldershot at 1.20, while the return journey was commenced at 3 p.m. and completed at 4.10 p.m. Lieut. Manisty also made a good flight.

On Thursday and Friday the weather was not very good, and the only work in the air was a number of test flights by Lieut. Reynolds with the re-erected biplanes. There was plenty of work, however, going on at the hangars in tuning up the machines, and this was continued on Saturday, when the weather stopped all flying. On Monday, Capt. Fulton was flying in a stiff breeze, but had to come down for adjustment to the engine, after which the machine was in fine form, and was seen flying at a height of 2,000 ft., from which it came down with a fine *vol plané*, with the engine stopped. Lieut. Hinds was out with the Breguet, and in one trip took M. Jullerot, of the Bristol School, for a good flight. On Tuesday, work was again confined to the hangars, all the officers finding plenty to do in overhauling their machines.

Bristol School.—For the purpose of making a height test, on Tuesday of last week, Mr. Valentine took up Lieut. Williamson on the military monoplane, afterwards performing a very fine solo. Tuition work then started in earnest, Pixton taking Lieut. Porter, whilst Jullerot carried Lieut. MacArthur. The wind was blowing at from 15 to 20 miles per hour all the afternoon, making things somewhat difficult.

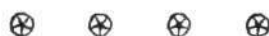
Prier, with Jullerot as passenger, was on Wednesday up on the military monoplane, making two fine flights, during which the machine showed a fine turn of speed. Lieuts. MacArthur, Borton, and Porter were taken for their last lessons by Busted, Pixton, and Jullerot. These three pupils commenced solo flying almost immediately afterwards, each one showing remarkable promise. At 11.26 Mr. Valentine left for a flight to Laffan's Plain, which won

him the *brevet supérieur*, arriving back again at 1.29. On his return, Mr. Valentine and his dog were taken as passengers by Jullerot in a biplane. Prier, with Jullerot as passenger, did a climbing test on the military monoplane, Valentine, with Mr. Thurstan, making a similar test on another machine of the same type. Pixton made his *début* as a monoplane flyer, handling the military monoplane with remarkable skill and precision. Two solos by Busted and Jullerot finished the day's work.

Next day was very gusty, and one six minutes' solo by Jullerot was the only flight made on the Plain.

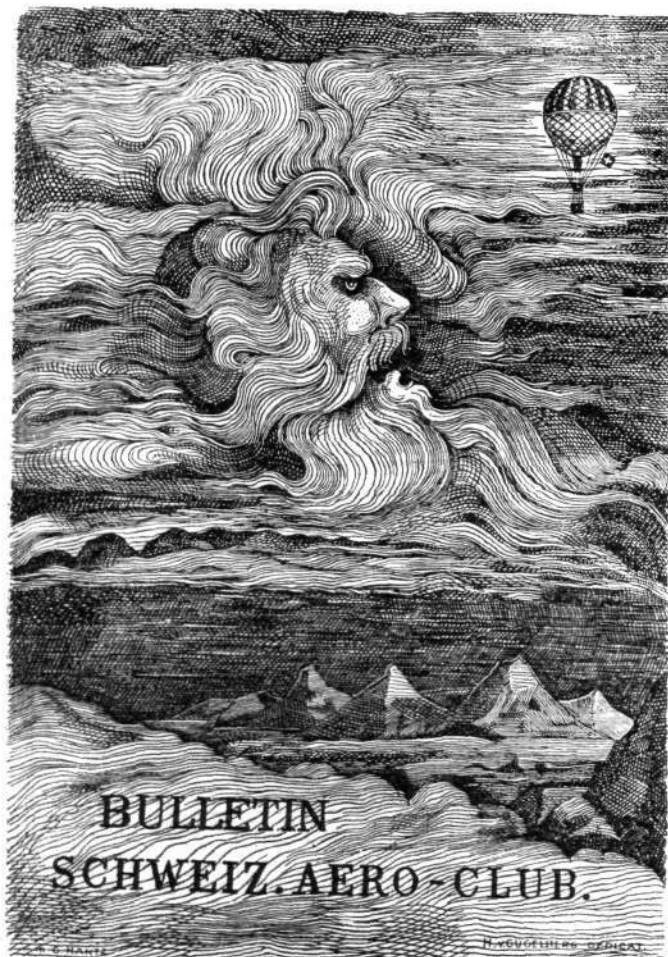
Valentine, with Lieut. Borton as passenger, was up on the military machine on Sunday, circling round Stonehenge for nearly half-an-hour. Jullerot took up Lieut. Duff-Dunbar and Lieut. Blacklock, and Lieut. Bowes, who recently secured his *brevet* on a Bristol, took his *fiancé* for a passenger flight.

Lieut. Porter and Lieut. Borton on Monday each made a twenty minutes' solo, showing signs of steady improvement. Mr. Smith-Barry also made a good solo. Busted made two solos on a single-seater monoplane, Pixton following his example, both of them showing that they have already mastered the Bristol monoplane as well as they have the biplane.



"PRINCIPLES OF FLIGHT."

THIS little book is an attempt to give a miniature perspective sketch of the development and present position of aeronautics. By its elementary character it is intended to introduce the subject to those unfamiliar therewith, and by its reference to specific problems it is hoped that it may be of some service to students. A characteristic feature of the book is the succinct way in which the various problems are set forth, or the many theories explained, and yet withal the language used is simple and clear, so making it easily understandable by every class of reader. The text is illustrated by a number of carefully-drawn sketches, while at the front of the book is included a most useful glossary of the terms generally used in aviation. The book may be obtained at most bookstalls, price one shilling, or direct from the offices of FLIGHT, 44, St. Martin's Lane, London, W.C., for 1s. 2d., post free.



Problematical design for the frontispiece of the Swiss Aero Club Bulletin.

AIR EDDIES.

THERE appeared in an Oxford paper recently photographs and a short description of a motorless aeroplane, the invention of a local enthusiast. The front booms of the wings bear on rowlocks and extend into the interior of the fuselage. As the account states that sustaining power is obtained on the principle of bird flight it is safe to presume that the daring pilot grasps these extensions and operates them as if he were rowing a boat. We are told that successful flights have already been made at Port Meadow, and as the wings have an area of only 25 sq. ft., and the weight of the machine "all in" is somewhere about 180 lbs., I am wondering why I haven't heard of the existing speed record being broken.

That the inventor is carrying out his experiments solely for the furtherance of the cause is borne out by the statement that he "is making no bid to enter the ranks of our professional flyers." If he suddenly altered his mind our present cracks would have to look to their laurels.

With the coming winter, the exodus of American aviators to those climes where more flying is to be obtained and, possibly, where more money is to be won, has commenced. Now Walter Brookins, Harry N. Atwood, Charles K. Hamilton, Frank Collyn, Pearmelee, and Oscar Brindley, whose names comprise most of the best-known flyers in America, are dispersing themselves severally, together with their respective machines, to various parts of South America, Japan, India, Cuba, and the Philippines, and to such places where the aeroplane is a much rarer sight than it has become in the States.

Interesting experiments have lately been taking place on Lake Windermere with a 50-h.p. Gnome-engined Curtiss-type hydro-aeroplane constructed by the well-known firm of A. V. Roe and Co., who have made a speciality of hydro-aeroplane work, to the order of Capt. Wakefield. Stanley Adams, an old Avro pupil, has been in charge of these tests, and although he has made repeated flights of considerable duration, he has not experienced the slightest difficulty in either rising from or alighting on the fluid element. I hear that Capt. Wakefield intends to obtain another machine, but this is to be of the Avro machine type, with which Commander Schwann is experimenting at Barrow.

Salmet, the Blériot instructor at Hendon, tells me that next year it is his intention to add other British, and perhaps world's, records to that of altitude, which he put to his name on Wednesday of last week. Much credit is due to Salmet for his fine flight under weather conditions which are by no means relished by hunters after altitude honours. At a height of 6,000 ft. he altogether lost sight of the earth, and, owing to the fog, the carburation of his engine became defective. However, despite these obstacles, he gamely struggled up to a height of 9,000 ft. As a matter of fact, he really ought to be credited with something slightly in excess of this figure, for he left earth with the pen of the barograph marking below the zero line.

The Grahame-White school at Hendon is mourning the loss of a very interesting and historical relic in the form of the "Blue Bird," one of the old Anzani-Blériots on which Grahame-White himself learned to fly, and which he used for teaching pupils at his school at Pau at the time when Gibert, the now famous R.E.P. pilot, was a mere mechanic in his employ. This machine has been sold to Sir Channing Wills, who is keenly interested in aviation, and who, I believe, is learning to fly under the private tutorship of Clement Greswell.

It has lately been reported in France that Andre Beaumont will take part in the aviation meeting which is to be held at Toulon at Christmas time. Unless I am much misinformed, the Toulonnais will be extremely lucky if they see their fellow townsman fly at

Novel Flights by Mr. Moorhouse.

On the 29th ult., Mr. Moorhouse flew over to Cambridge from Huntingdon for lunch, and while flying back in the afternoon he saw a heron, and followed in its track up to the aerodrome. On Monday, having accepted an invitation of the Northants County Golf Club to lunch, he flew over from Huntingdon, and landed on the first green of the course. On the outward journey he found it very cold, and the going was somewhat slow, but on returning he covered about 40 miles in 35 mins. On Tuesday he was up after dark at the Huntingdon Aerodrome, and made several circuits at a height of 1,000 ft. by the light of the moon.

Christmas, for he has scarcely yet fully recovered from his mishap at Rheims, and will probably need a month or two's rest before returning to the *cloche* and foot-bar.

Apparently the Grahame-White firm does not intend to lose much time in preparing itself for the forthcoming British military aviation tests. Their works, and, in my opinion, none can boast of being more eminently suitable for the rapid and efficient construction of aeroplanes on a large scale, are preparing to commence the building of a three-seater Grahame-White monoplane. This machine, whose appearance is awaited with considerable interest, will in all probability be equipped with the 100-h.p. Gnome motor with which Grahame-White won the Gordon-Bennett trophy and the Statue of Liberty race in America last year.

Frank Champion, late of the Blériot School, Hendon, is still maintaining the good reputation he has earned for his daring flights on the Gnome-Blériot in Southern California. On November 18th he left the Dominguez Field, and mounting to 6,000 ft., flew off to San Pedro, returning by way of Long Beach for the purpose of delivering a note sent by one of the pupils of the Dominguez school—who had that morning succeeded in carrying out a 15-minute flight for the first time in his life—to his father.

As hinted in these columns about a month ago, W. H. Ewen, who has achieved considerable fame up North, and throughout this country, for his excellent flying on his 28-h.p. Anzani-Deperdussin, is transferring his school from Lanark and establishing it at the London Aerodrome, Hendon. To those prospective pupils who do not quite fancy the idea of leaving London to take up a temporary abode at any of the provincial flying grounds, his school has points in its favour, and the fact that he gives complete tuition on two distinct types of machine for one fee ought certainly to earn for his school considerable popularity.

It was reported last week in the daily papers that Lieut. Snowden-Smith, while flying from Brooklands to Aldershot on his Blondeau-Farman, was beset by engine troubles which caused him, in landing hurriedly, to do considerable damage to his machine. As a matter of fact he was forced to land in a small open space, and had it not been for the unsuitable nature of the ground he would have flown out of it, after the engine had been put right. No doubt the action of dismantling the machine prior to its removal to Brooklands by road, was taken by a local pressman as an indication that considerable damage had been done. This was not the case, for the machine has been back at Brooklands, erected, and ready to fly, for the past week.

It is rather interesting to note that quite a lot of musical talent exists amongst aviators at the present time. Perhaps the most notable example is that of W. H. Ewen, Mus.B. (Edinburgh), who gave up his profession as organist in order to indulge in the deeper joys of flying. Grahame-White seems to be the next in merit in this respect, but his proficiency lies more with the vocal branch of the gentle art, rather than with the manipulation of an instrument. Both Wheatley and Jullerot are quite good exponents of piano, the former revelling in classics, the latter in music of a lighter genre. Fleming, of the Bristol school, is a mandoline expert, and his performance of "Down in Jungle Town," balancing a chair on his nose the while, has been a source of great appreciation at Pine Cottage. The list would not be complete without mentioning Lieut. W. Lawrence, also of the Bristol school, who has just fallen a victim to the fascination of the organ, as will be evident to anyone hearing painfully punctuated passages proceeding from the portals of St. Paul's, Covent Garden, while passing in that neighbourhood.

"OISEAU BLEU."

New British Height Record.

By nearly 50 per cent., M. Salmet, Chief Instructor of the Blériot School at Hendon, on Wednesday of last week, improved on the British height record, which has stood at 6,595 ft. since it was made by Mr. Armstrong Drexel at Lanark in August last year. Using a single-seater Blériot, M. Salmet rose steadily and rapidly until the sealed barograph showed 6,000 ft., and then climbing became much more difficult owing to cold affecting the carburettor. Under these circumstances, the pilot did well in reaching the height of 9,000 ft. when he decided to come down. With brighter weather conditions he hopes to do much better at his next attempt.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

THE ANNUAL DINNER will take place at the ROYAL AUTOMOBILE CLUB, Pall Mall, S.W. (by kind permission), on THURSDAY, DECEMBER 14th, 1911, at 7.30 for 8 o'clock.

In order to facilitate the arrangements, members are requested to notify the Secretary at once if it is their intention to be present.

The accommodation is limited to 250, and as over 200 tickets have already been issued, the list will be closed as soon as the number of 250 is reached.

Tickets (inclusive of wines, cigars, &c.): Gentlemen, £1 5s.; ladies, £1 1s.

The following prizes won during the year will be presented:—

The Manville £500 Prize ... To C. H. Pixton.

The British Empire Michelin Trophy
No. 1 and Cash Prize of £500 ... To S. F. Cody.

The British Empire Michelin Trophy
No. 2 and Cash Prize of £400 ... To S. F. Cody.
After the Dinner there will be a musical Entertainment.

Military Aeroplane Competition.

The deputation of manufacturers waited upon Col. Seely at the House of Commons, on Tuesday, the 5th inst. Sir Charles D. Rose, Bart., M.P., introduced the deputation, and a report of the proceedings will be found in this issue.

Mr. J. Armstrong Drexel.

Members will be pleased to hear that Mr. J. Armstrong Drexel, who underwent an operation for appendicitis a few days ago, is now making good progress.

HAROLD E. PERRIN,
Secretary.

166, Piccadilly.

PROGRESS OF FLIGHT ABOUT THE COUNTRY.

NOTE.—Addresses, temporary or permanent, follow in each case the names of the clubs, where communications of our readers can be addressed direct to the Secretary. We would ask Club Secretaries in future to see that the notes regarding their Clubs reach the Editor of FLIGHT, 44, St. Martin's Lane, London, W.C., by first post Tuesday at latest.

MODEL CLUBS.

Birmingham Aero Club (8, FREDERICK ROAD, EDGBASTON).

LAST Saturday afternoon, owing to the state of the weather, Mr. E. Trykle and Mr. G. Haddon Wood were the only members to get any satisfactory flights; but, apart from this, there was a great attraction in the trials of a model glider. A cord was attached to the end of each plane; the glider was then towed, and rose rapidly to a height of about 20 ft., where it remained stationary for several minutes. The towers afterwards walked with the wind for about 200 yards, the glider remaining aloft the whole of the distance.

On Sunday the weather being fine there was quite a flock of model flyers on the ground. The best flight of the day was by Mr. E. Trykle, his model after flying for 40 secs. making a splendid glide of about 150 yards from a height of about 50 ft., the glide taking 35 secs. Mr. A. F. McManus's model showed a good turn of speed, travelling about twice as fast as Mr. G. Mason's model. Mr. G. Baker's model distinguished itself by its high and steady work, as did Mr. G. Haddon Wood's. Mr. W. Lunn was also getting some excellent results.

This week-end, a couple of work-benches arrived, and also a chest of carpenter's tools. These will prove extremely useful in future, both to the model makers and glider constructors.

Blackheath Aero Club (5, LIMESFORD ROAD, NUNHEAD, S.E.).

ON Saturday last the club held a very successful meeting at the Kidbrooke Ground, when many fine flights were made in the distance and duration competitions. The former event was won by Mr. E. R. Brown, of the Palmer's Green and District Ae. Club, with a flight of 437 yards. In this, Mr. Brown's monoplane never for one moment deviated from a straight course, thus showing how carefully its constructor had "tuned" it up. The longest duration flight was made by Mr. Slatter (B.Ae.C.), this model—a monoplane—remained in the air for 45 secs. Good flights were also made by the Brothers Smither, and Messrs. Rodgers, Lingard, Trollope, Plummer, Uwins, and others.

Numerous visitors—with and without models—were present, and a wonderful exhibition of model flying was witnessed. Several times during the afternoon five or six machines were to be seen in the air together. Some of the models which were not to be persuaded to fly straight, "made good" by attaining great altitudes, and this feature of the flying was appreciated very much by the spectators.

The Committee wish to thank the many model aeroplane enthusiasts who came from Palmer's Green, Croydon, Tooting, South Norwood, Chislehurst, &c., and these gentlemen may always be sure of a hearty welcome, in fact, the Blackheath Aero Club's grounds are always at their disposal whenever they desire to use them.

At Blackheath and Lee a great number of practice flights were made, and further experiments conducted with the tractor-screw models, which are becoming very popular with B.Ae.C. members.

Reports to hand about the models which are being constructed for

the Exhibition to be held at the Central Hall, Peckham, on Jan. 4, reveal many original ideas, but these must not be divulged until the exhibition night, when the numerous visitors expected will have ample opportunity of studying these new and practical points.

The following new members were elected: Miss W. De Palmer, of Forest Hill; Mr. A. E. Collins, Woolwich; and Messrs. F. Plummer and C. Uwins, of South Norwood.

As a number of ladies have shown great enthusiasm in the subject of "model aviation," the Committee have decided to accept ladies as members of the B.Ae.C. on condition they show their interest in a practical manner—by flying models. The subscription for ladies will be 2s. per annum from December 1st.

To-day (Saturday) Messrs. Woollard, Clark, and Pizey will give exhibition flights at the Grove Park Grounds, and during the week-end the usual flying will take place at Kidbrooke, Blackheath, and Lee.

Will members who have not yet forwarded their subscriptions, kindly send same to the treasurer.

Brighton and District Ae.C. (36, LITTLE PRESTON ST., BRIGHTON).

SOME fine flying at Brighton-Shoreham Aerodrome by members of the club on Saturday, December 2nd, resulted in several new members joining. The wind was put down as "wicked," but thanks to level country round aerodrome there were very few bad gusts. The club "cracks," Bate, Burghope and Von Wickmann made many long flights, and the last mentioned had very bad luck with his Weiss-type monoplane which proved too small for flying in a wind. Holford also had bad luck, several times just missing getting his ticket for a 600 ft. flight. White and Frost performed strange trick flights. Burghope's huge 1½ pound monoplane flew in very dignified manner, in supreme contempt of wind. Several tractor-screw monoplanes and two biplanes are now nearly ready for trial. If those members who experience trouble in inducing their models to fly would pay a little more attention to workmanship there is little doubt they would succeed, as the designs are all quite rational. Members must do their utmost to show proprietors of Brighton-Shoreham aerodrome that they appreciate their kindness in allowing the club to use the aerodrome. Flying to-day (Saturday 9th), at Shoreham.

Codnor Park and District Model Aero Club (IRONVILLE HOUSE).

THIS club has been formed about six months, and has had a fairly successful flying season. At the last meeting Mr. F. S. Boreham qualified for his certificate with his twin-screw monoplane. Several other members made flights, but the strong wind prevented any extended performances. Mr. J. Boreham, the president, had the misfortune to smash his twin-screw monoplane, which collapsed, owing to a side-gust, when flying well.

Conisborough and District Aeroplane Soc. (18, CHURCH ST.).

ON Saturday last F. J. Wright flew a model 1,280 feet. The model was 4 ft. long, and had two 9 in. propellers. 640 turns were

THE GOVERNMENT AND THE AEROPLANE INDUSTRY.

DEPUTATION TO COLONEL SEELY.

ON Tuesday afternoon, 5th inst., at the House of Commons, Sir Charles Rose introduced a deputation to Col. Seely, consisting of representatives of the leading aeroplane manufacturers and designers, members of the Committee of the Royal Aero Club, and Council of the Aeronautical Society. The object of the deputation was to present the position of the British industry in respect to the proposed Government competition for aeroplanes, and to ask the Government to give consideration to certain facts, and in particular to ask the Government to issue immediate conditional orders to British manufacturers, so that they might be assured of a return for their private enterprise, in the event of producing machines fulfilling the stated requirements, and not merely have to take a sporting chance of winning one of a limited number of prizes.

In introducing the deputation, Sir Charles Rose outlined various points that the different speakers were to emphasize and a brief synopsis of their argument may be given as follows:

1. The Government must depend upon the home sources of supply when the use of aeroplanes in the Services is begun.

2. The proposed competition in its present form is not going to help the Government to build up that home source of supply, because in a competition held at the present time the prize would inevitably go abroad. In effect, this would result in the British Government financing foreign development.

This is due to the fact that the British industry at the present time is not in a fit condition to meet foreign competition on level terms. The industry was established, and is still maintained, purely by private enterprise, whereas the French industry has received a large amount of Government support from the outset. If sufficient space of time is given to the British industry, it will be in a position to meet foreign competition with equal chance of success.

3. The only effective way to do this is to give conditional orders to the British firms immediately. These orders should be distributed widely, to ensure that the greatest amount of talent may be utilised for national purposes. You do not buy the foreign brains when you buy the foreign machine, neither do you buy the foreign mechanics with the foreign machine; but both brains and trained mechanics are essential to the successful development of a type.

4. Moreover, aeroplane materials are themselves specialised products, the maintenance of an adequate supply of which is equally dependent upon the existence of a healthy industry. The Government cannot even build machines in this country of any description, unless the materials are at hand.

5. Finally, if the object of the competition is to produce the best machine, it is unreasonable to expect British constructors to go to the expense of making their best efforts against this handicap of foreign competition, unless they are first offered the conditional orders.

After the various speakers had delivered their remarks, the full text of which will be found elsewhere, Col. Seely replied, in the first instance stating how pleased he was to be able to hear what the representatives of the industry had to say, in which remark he also coupled the name of General Haddon. Col. Seely then proceeded to speak upon the various points raised by the deputation, and in particular emphasized his surprise at the suggestion that the competition might beneficially be postponed. He did not touch directly on the matter of conditional orders, but several important points evolved from his remarks, and among them the following may be summarised as giving the gist of his views:—

1. The grounds for holding the competition, urged initially by deputation on both sides of the House, still held good, and the Government would go through with it.

2. The request for postponement caused him surprise, the difficulty in these matters generally being to go fast enough. The present straits of the industry seemed to be all the more reason for hurry. If postponement of the date was really desired, the request should be put forward.

3. Some aeroplanes would be wanted before the competition was over.

4. The object of the competition was to learn all we could, and the principal prize would certainly be open to the world.

5. It was a mistake to suppose the British competitor would not have a good chance of winning. Best to wait until the conditions were seen. The deputation had raised the question of silent engines, for example. It was queries of this nature that they must bear in mind and ponder carefully.

6. It was not proposed to manufacture largely at the Government factory.

7. The Government regarded the aeroplane industry as an armament industry, like that of manufacturing rifles, guns, &c.,

except in very special cases, therefore machines must be built in the United Kingdom.

8. It was impossible to say how many machines would be required, but the statement had already been made in public that about 100 officers were to be trained, and machines would, of course, be needed in connection therewith.

9. More than one type of machine would be required.

10. In Col. Seely's private opinion the industry should not rely on sole support from the Government, which is unlikely to be able to offer enough work for its full development. Flying had not materialised as a sport because of the risks. The machines should be made safer therefore, and thereby receive the public confidence. Also, the safer they were the more the Government were likely to encourage their use.

11. The date proposed for the competition was June next.

Col. Seely then asked if there were any other questions, and the Marquis of Tullibardine desired to know how soon the rules of the competition would be published. To this Col. Seely replied they would be out in about a fortnight, and in continuing he remarked more definitely than before that some orders would be given before the competition was over in order to meet the immediate needs of the Army. Mr. A. E. Berriman thereupon asked whether these orders would go to British firms, also whether, in view of the immense amount of time and money spent by private enterprise in England, British machines that fulfilled the requirements of the competition would be bought and not alone those machines that happened to win prizes.

Col. Seely replied to the effect that the movement in France had shown that it would be unwise for him to bind himself to purchase a large number of any one type of machine. In respect to the point about the purchase of British machines that came up to the standard of requirements set by the competition, although not necessarily prize winners Col. Seely said that the matter would be borne in mind, and the answer would be found in the specification of the competition.

Col. Seely then withdrew, and the meeting proceeded to pass a resolution to the effect that the Government be recommended to start the competition in the first week of September, 1912, and not earlier.

The following are the various arguments as put forward by various speakers from the points of view of the different interests represented:—

General Policy.

Speaker: Mr. J. W. DUNNE, representing The Blair Atholl Aeroplane Syndicate.

War materials, and industries relating thereto, have a separate little political haven of their own, and are subject to a special and peculiar code of laws. Free Trade and Protectional disputants ignore them as being manifestly outside the scope of contention, and the bitterest tariff struggle leaves them totally unaffected. For they have always been subject to one special policy, the outcome of military exigencies, a policy which has been adhered to unswervingly by all the great European Powers, and supported by the unhesitating concurrence of statesmen of every shade of political opinion. And that policy may be briefly defined as a point blank refusal to recognise the existence of any permanent source of supply that is not situated in, and under the direct control of, the country affected. In rare instances, where no home supply has been in evidence, resource has been had to the complaisance of some friendly neighbour, but such departures from precedent have always been of the most temporary nature, were never undertaken save under the more urgent necessity and with the greatest caution, and meanwhile every nerve was strained to remedy the country's internal deficiency by the earliest possible date. I may be wrong in my history, but I believe the Holland submarine boat was a case in point.

This special and peculiar aspect of armament industries is so well known to every statesman, that I would have been ashamed to dwell upon it, were it not that one or two journalists, presumably through nothing but dense ignorance, have been actually trying to persuade the public that in this matter of military aeroplanes some question of Free Trade *versus* Protection is involved, and that this deputation is assailing the Free Trade Policy of our Government. That, of course, is sheer nonsense. It is as representatives of an armament industry that we come before you, it is to an armament industry that we refer in our arguments, and we ask you to deal with these solely from the point of view of a War Office considering what treatment it shall mete out to what must eventually be its sole civil source of supply.

if the same amount of care and trouble was expended on them. It is a complicated motor to manage, far beyond the capabilities of anyone not specially trained to look after it. Certainly it has achieved great success in France, but one must bear in mind it was practically the first successful aviation motor, and, moreover, that the Frenchman is a much more natural mechanic than the Englishman.

The motor in question has got itself standardised to a certain extent by the fact that many constructors have built aeroplanes to take it, but I am convinced that in England we have, and can build, less complicated motors to give us as good results which will become every bit as popular. I would like to point out that the world's duration record is held not by a Gnome motor, but by another which was for a long time looked on with disfavour as being too heavy.

The French system of attaching sections of officer aviators to the firms whose machines they fly, seems to give satisfaction and might perhaps be worth considering. They have an officer, himself an aviator, in charge at each school or aerodrome, and he is directly responsible to the officer in charge of the Air Corps. This plan saves the Government the expense of erecting a large number of sheds and obviates the necessity of establishing military aerodromes, enables sapper mechanics to become trained under the supervision of experienced men, and it is naturally to the advantage of firms to assist the officers in all ways. It also encourages officers to fly from one aerodrome to another, as they are always sure of finding sheds and mechanics, in itself a great advantage.

The only two objections to this scheme it seems to me are these. It will throw a good deal of work on the officer in charge of the Air Corps, because it will in effect result in his controlling a vast command, spreading all over the country, with ramifications extending into every factory and aerodrome in the kingdom. This is, of course, a big responsibility for one man, but the French accepted it because the advantages of having the whole industry under the eye of the officer upon whom the maintenance of the air fleet would depend in war time outweighed any possible objection to the vesting of too much power in one individual.

The other objection is, that a great number of mechanics would have to be transferred from the Army Aircraft Factory to the more direct control of the officer in charge of the air corps. But that is a very minor matter.

In conclusion, I would respectfully urge that the Government, before placing orders abroad, should state their requirements, giving some assurance to British firms that, if they produce machines which satisfactorily carry out the Government tests, they will receive sufficient orders to reimburse them for their original outlay.

Construction and Design.

Speaker: Mr. L. HOWARD-FLANDERS, representing L. Howard-Flanders and Co.

There are at present in this country a considerable number of constructors of aeroplanes who have the necessary knowledge, and are prepared to design and build machines equal in all respects to the leading French aeroplanes.

These constructors have acquired their knowledge by years of study and experiment, which has involved considerable expenditure in time and money. Owing to the lack of orders for military aeroplanes, they have been unable to command sufficient support from capitalists to allow them to carry on their experiments with that facility which has obtained in France, where assistance has come from the State.

Now, however, the constructors of aeroplanes in England know that they can produce work equal to any, and are not afraid of international comparison under equal conditions. We have, however, to work for, and live on, actual orders, and not merely on hope; especially as we all have to maintain a staff of specially-trained workmen, it being impossible for men, trained in other branches of the engineering trades, to satisfactorily perform the work until they have received additional training. We understand that the Government proposes to purchase sundry aeroplanes for military purposes, and we ask that you would recognise us, by placing provisional orders with those constructors of aeroplanes, in this country, who are fitted to undertake the work. We do not ask in any way that you should purchase these machines because they are English, but merely that you will permit the British constructor to prove his worth. Furthermore, we do not ask for assistance in the form of a subsidy or prepayment of any sort. We merely wish to be assured of the purchase of our aeroplanes, when they have successfully passed the prearranged tests, which tests may be as searching as you please.

We would be glad to know, as soon as it suits your convenience, what type of machine will be regarded most favourably; because, although the trials in France were for machines to carry two passengers in addition to the pilot, yet we hear that the French

Government has purchased 200 aeroplanes to carry the pilot only since the commencement of the trials. Hence we conclude that for the purposes of warfare there is need for at least two types of aeroplane; the one carrying considerable weight at moderate speed, and the other of small size, to carry the pilot only at high speed.

The materials used in aeroplane construction are of a special kind, and are not readily obtainable. At present the demand is so limited that it is difficult to obtain the best. This means that in the event of a sudden large demand, that is one which has not grown gradually with the trade, good material would be unobtainable. At present in France there is absolutely no good ash, and various of the leading makers are using American ash, seasoned by the hot air process, as they are unable to wait for the wood to season naturally; this ash, so treated, is absolutely unsafe, and many of the fatal accidents which have occurred recently are due to the use of such materials. The opportunities for obtaining the best materials are greater in England than in any other place in the world. For instance, silver spruce, which was introduced into this country for making oars, is unknown in France and the poplar wood which is used there is greatly inferior. As might be expected those who hold a stock of good material will not supply small quantities from their best stocks. Some few firms have supplied special steel and other requirements in quantities which must have meant considerable loss to them, because it does not pay them to alter their rolls and jigs for an order of a few cwt., even at special prices, when they usually only handle orders of several tons. In the past, several makers have supplied us, but lately they have refused, because they say that the aeroplane trade has not increased as quickly as was expected, hence there is a great need to give us facilities to gradually make a demand for the right material, by placing orders in this country.

Furthermore, as most of the constructors have schools for instructing pupils to become aviators, we submit that it is desirable that the officers who are being trained as pilots, should be distributed amongst the various schools, in order that there may be pilots who are proficient in flying various types of aeroplanes, there being great difference in the management of the various types.

Finally, we would ask that our requests may be seriously considered within a short space of time, lest some of us shall have been unable to continue to live on hope, which would cause a number of highly-trained men to be distributed among other industries, whence they will not be readily recalled in time of need.

Engine Manufacturers.

Speaker: Mr. F. MAY, Representing Green Motor Engine Co.

As a representative of the manufacturers of British aeroplane engines, I would beg you to use your utmost influence to secure for that industry a fair proportion of the amount that it is the intention of the Government to allocate in the forthcoming Military Trials, be it in the form of orders subject to conditions or monetary prizes. I am confident the British manufacturer will heartily respond to such an inducement.

There are to-day all-British aeroplanes in this country that would (had they been allowed to compete) have come through the French military trials just concluded with very satisfactory results.

I would call your attention to the fact that the French engine of the rotary type does not meet the requirements of the military aviator, for the following reasons:—

Firstly.—It is noisy, and cannot be efficiently silenced, which is highly essential in time of war.

Secondly.—The skilled mechanics necessary for the efficient working of the engine in question make it an impossible problem under the severe conditions the Service demands.

Thirdly.—It would be an impossibility to obtain delivery of this rotary type, or any other type of foreign engine, should this country be at war with the country in which they are produced, and it would be only natural to assume that in time of peace no foreign factory would supply to this Government the very best of its products, to the detriment of its regular customers at home.

Fourthly.—The consumption of petrol and castor oil for lubrication are excessive, and I guarantee there are English engines equipped for a 6-hours continuous flight, that would weigh less pounds per horse-power than the best foreign engine.

Fifthly.—Monopoly and fashion are the worst possible factors for the development of any industry, and it is an established fact, that the popularity of French rotary engines has been established to the detriment of other engines—foreign and British. There are British aero engines with a manufacturing experience of nine years' standing, that are equal in every respect to the best foreign produce.

It is also well-known in the trade that in all the large competitions—London to Manchester flight, Paris to Rome, the European Circuit, the Circuit of Great Britain, &c.—in which the foreigner has been successful, those results have only been achieved at enormous cost to the manufacturer, who has been amply reimbursed by his

Government, and had the industry in this country received the recognition that the foreign industry has, it would to-day have been in an equally flourishing condition.

In the Circuit of Great Britain, twenty-seven of the rotary type of engine were entered, and only three of them completed. Two British engines were entered in the same event, and one finished. The number of skilled mechanics that attended to the three rotary type engines was legion; a youth 18 years of age attended to the requirements of the British engine that completed the 1,010-mile course.

In 1910 a gentleman offered a £1,000 prize for competition among British aeroplane engine builders for a 24 hours' continuous run. Three competitors started, and each one achieved considerable success. A Blue-book of that trial was supplied to both Houses of Parliament by the National Physical Laboratory. This year a similar competition is in progress, but one alteration in the conditions is that the competition shall be thrown open to the world. And what has been the result? Not a single foreign entry has materialised, from which we may gather that the conditions are either too severe or the prize too small.

From the above remarks, I hope, sir, you will gather that all the British manufacturer requires is an opportunity to compete in any trials under equal conditions, to show that he is capable of producing an article equal in every respect to the best foreign product.

Manufacturers of Aeroplanes and Aero Engines.

Speaker: Mr. H. G. BURFORD, representing Humbers, Ltd.

I rise, in company with the deputation, to place before you certain arguments in connection with the developments of the manufacture of aerial machines, engines, &c., in Great Britain. On behalf of the manufacturers I would urge the Under Secretary and the Government to consider the position of the manufacturers in connection with this industry. Seeing that the question of aeroplane construction is of national importance, we, the manufacturers, consider that the time is fully ripe for the British manufacturer to have consideration at the hands of the Government. Owing to the fostering of the industry by Continental nations, and also subsidies from their various Governments, the foreign manufacturers have been in a unique position, and the contrary exists in this country, namely, the inventors, aviators, and the manufacturer have practically spent their all, both in money and time, with no official encouragement.

I submit that the present position cannot be much longer maintained, and the country or the Government will lose the experience and organisation of many manufacturers owing to the lack of financial support to carry them on. In connection with this important industry, there are many points to which I would venture to draw the attention of the Government, one of particular importance, namely, the training and equipping

of competent men and mechanics in connection with the use of aeroplanes. This is a highly-technical employment, and requires men of tact and ability, and, failing properly-organised concerns who can see some financial return for their money, there must be a lack of such men in this country, which in our opinion is fraught with eminent danger to the nation. I submit that there are in England to-day a number of firms who are in a position to supply and meet all reasonable demands that the Government may make in connection with the supply of aeroplanes and their various equipment. There are firms in the country who not only have had wide experience both in the manufacture of aeroplanes and the engines, but who have stocks of material suitable for the construction of these machines, and they are most anxious to place these at the disposal of the Government, so that the organisations which are now lingering may be revived, with benefit both to the manufacturer and to the nation at large.

I submit that, with the experience which has been gained by the military experts in the various competitions which have been held in France and other countries, the parties are now in a position to define their requirements; and whilst welcoming the proposals of the Government in connection with offering a prize for the best military aeroplane, we, the manufacturers, submit that, during the time this competition is being organised and taking place much valuable time will be lost, and in many cases firms which are now interested will have closed down, owing to the lack of funds. I would urge that immediate orders be placed with the English firms who are competent to deal with orders in a way which will satisfy the requirements of the Government, always provided the conditions, namely, that delivery will not be accepted unless the 'plane carries out the specified tests, and we would urge that orders be given out at once to certain firms with the experience which has now been acquired by military experts.

We, the manufacturers, understand that it is a governing condition of Government orders in connection with munitions that they should be manufactured in this country. This being so, whatever be the result of the competition and whoever may win the prize, the results will be to foster and maintain the British industry.

We further assume that during the period of preparing for the competition which has been announced, military authorities will require a number of men to be trained, and mechanics selected, who have a knowledge of aviation and the machines which they have to operate. In this direction, we offer the facilities which manufacturers in this country have at their disposal to the Government for the training of bodies of men, so that by the time the competition is decided competent men will be at hand.

In conclusion, I beg to thank Col. Seely for the way in which he has received this deputation, and I trust that the points which we have tried to make clear will receive due consideration in the future programme.



Fatal Accident at Filey.

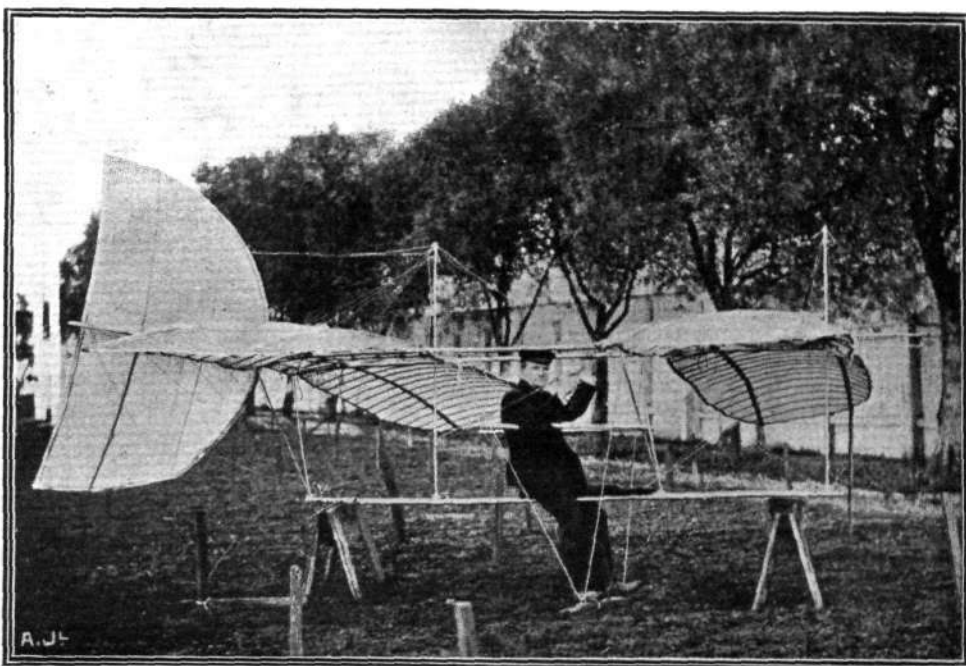
JUST as we go to press, we regret to learn of a fatal accident at Filey, by which the well-known Blackburn pilot, Mr. Hubert Oxley, and his passenger, Mr. Robert Weiss, lost their lives.

An Aerial Exhibition at Moscow.

UNDER the auspices of the Russian Aero Club, an aeronautic exhibition is to be held at Moscow about April next. It is proposed that the exhibition should remain open for six weeks, and that a series of exhibition flights should be given during this period on the Moscow racecourse. It is hoped to secure exhibits from Great Britain, France, and Germany.

An Armoured Aeroplane for Tripoli.

AT Milan on Sunday, Naval Capt. Guidoni was testing a Farman-type biplane, built for the Italian Government at Toliedo, especially for use in Tripoli. It is distinguished by the fact that the lower part of the machine is completely armoured, to protect it from projectiles fired from the ground. After satisfactory trials, the machine was packed up and sent to Naples for transport to the front.



The late Prof. John J. Montgomery on his glider, upon which he met his death at San Jose, California, on October 31st, as recently recorded in FLIGHT.

DECEMBER WEATHER. THE AVERAGE OF 100 YEARS.

By T. F. MANNING.

THE last month of the year is the worst, or second worst, month of the whole twelve for flying. It runs neck to neck with January, which has slightly longer days and fewer fogs but more gales and far more snowfalls than December.

December is the second stormiest month of the year. It has three times as many gales as June, but they are mostly warm winds coming from the south and south-west. As a rule a very stormy period of ten days beginning about the 12th, is followed by four or five days of calm—the halcyon days—just before Christmas.

But with the dropping of the wind come the fogs. The three days before Christmas have had 65 fogs in a hundred years, and, if we take the whole week from the 22nd to the 27th, the chances of a fog are 4 to 3, but against a really dense fog the odds are 3 to 1. During the whole month there is an average of five fogs of all kinds and one dense fog. Still, this month is a trifle less foggy than November.

In frequency of snowfalls December comes only fourth. The average of snow days is three, and a fall is nearly twice as probable during the second than during the first half of the month. It will be seen from the table that snow is much more likely immediately after Christmas Day than before it.

In this month we have one-eighth of the whole year's gales, one-sixth of the snow, and nearly one-sixth of the fogs.

December has the shortest days, the least amount of sunshine (only one-sixth of the sunshine of July), and the largest percentage of cloudy and overcast skies, of all the months.

The humidity of the atmosphere is at its highest point for the year, and, although the rainfall is comparatively low, rainy days are very numerous.

Towards the end of the month the coldest period of the year sets in and there is little improvement until the end of February.

Usually the third to the ninth is a singularly warm period.

It may be of use in this last article to sum up the characteristics of the months in tabular form. It will be seen that, uncertain as the weather may be in any year, there is, over a long period, a gradual and regular increase and decline of the various phenomena, so that one may foretell with some probability the relative prevalence of gales, fogs and other adverse conditions in any month.

This table gives the number of gales, &c., occurring in each month during a period of 100 years:—

	In 100 Years.									
	Gales.	Fogs.	Dense Fogs.	Snow.	Hail.	Thunder.	Rain Days.	Rainfall.	Mean Temperature.	Hours of Sunshine.
January ...	253	398	84	396	38	8	1,471	1'88	38'6	42
February ...	203	298	61	324	60	6	1,238	1'48	39'5	56
March ...	223	273	42	312	129	17	1,312	1'52	41'9	106
April ...	121	151	17	116	148	73	1,201	1'57	47'3	149
May ...	97	76	9	14	89	138	1,232	1'91	53'1	201
June ...	76	75	7	0	33	197	1,156	2'04	59'4	196
July ...	89	64	6	0	14	275	1,238	2'40	62'7	208
August ...	89	121	21	0	15	207	1,295	2'34	61'6	189
September ...	112	374	66	2	18	100	1,235	2'15	57'2	141
October ...	161	502	97	15	17	36	1,504	2'78	50'0	93
November ...	194	524	130	74	23	20	1,395	2'22	43'5	50
December ...	236	508	107	247	29	11	1,417	1'83	39'9	36
Year ...	1,854	3,364	647	1,500	619	1,088	15,694	—	—	—

From this it appears that in an average year we are to expect 18 gales, 34 fogs, of which 6 are dense fogs, 15 snowfalls, 6 hailstorms, 11 thunderstorms, and 157 rain-days.

Comparing December with the preceding and following month

we get, in a period of ten years, the following numbers of gales, fogs, &c.:—

	Nov.	Dec.	Jan.
Ten years' gales ...	19½	24	25½
„ fogs ...	52	51	40
„ dense fogs ...	13	10½	8½
„ snow-falls ...	7	25	40
„ rain-days ...	139	142	147
„ hail-storms ...	2½	3	4
„ thunderstorms ...	2	1	1
Average rainfall (Greenwich) ...	2'22 in.	1'83 in.	1'88 in.
Mean temperature (Greenwich) ...	43'5	39'9	38'6
Hours of sunshine (Greenwich) ...	50	36	42
Degree of humidity (Greenwich) ...	87'3	88'6	88'0

Daily Table of Weather Phenomena in December.

The figures show the number of each event in one hundred years.

Day.	Gales.	Fog.	Dense Fog.	Snow.	Hail.	Thunder.	Rain Days.	Mean Temp.
1 ...	5	15	2	4	1	—	52	40'6
2 ...	13	16	4	5	1	—	38	40'6
3 ...	8	8	1	8	1	2	48	40'8
4 ...	8	10	—	4	—	—	52	41'1
5 ...	6	13	—	6	1	—	65	41'3
6 ...	7	15	2	8	1	—	55	41'3
7 ...	13	9	1	6	1	1	54	41'0
1st week ...	60	86	10	41	6	4	364	—
8 ...	9	18	4	6	2	1	51	40'6
9 ...	8	17	3	7	—	—	44	40'3
10 ...	6	23	4	9	1	—	43	39'9
11 ...	4	23	7	7	1	—	43	39'8
12 ...	8	17	3	4	1	—	46	39'9
13 ...	8	20	5	4	1	—	48	40'1
14 ...	7	18	2	4	1	—	49	40'2
2nd week ...	50	136	28	41	7	1	324	—
15 ...	10	16	3	5	1	—	49	40'3
16 ...	7	15	2	7	1	—	46	40'2
17 ...	11	20	4	11	—	—	46	40'0
18 ...	8	12	3	7	1	—	58	39'7
19 ...	7	12	4	12	1	1	38	39'3
20 ...	12	14	3	8	1	2	39	39'0
21 ...	7	15	2	8	1	—	41	38'8
3rd week ...	62	104	21	58	6	3	317	—
22 ...	7	24	7	12	1	—	44	38'6
23 ...	2	21	4	6	4	—	29	38'4
24 ...	5	20	5	9	1	—	32	38'3
25 ...	8	18	3	10	—	—	33	38'4
26 ...	8	15	5	14	1	—	40	38'4
27 ...	5	18	4	16	—	—	48	38'5
28 ...	10	17	4	14	—	1	52	—
4th week ...	45	133	32	81	7	1	278	—
29 ...	7	15	5	7	1	1	49	38'6
30 ...	6	16	4	9	1	1	44	38'6
31 ...	6	18	7	10	1	—	41	38'6
Month ...	236	508	107	247	29	11	1,417	39'9

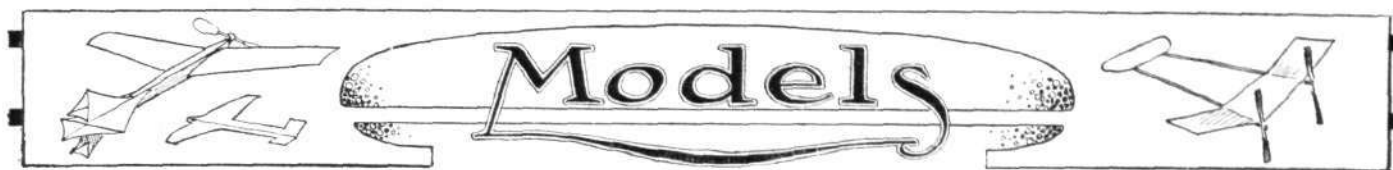
Hydro-aeroplanes on Lake Windermere.

IN its initial flight on Saturday week, the Curtiss-type hydro-aeroplane, built for Capt. E. W. Wakefield by Messrs. A. V. Roe and Co., performed very successfully, with Mr. Stanley Adams at the wheel. Starting from Capt. Wakefield's headquarters at Hill of Oaks, between Bowness and Newby Bridge, the machine made eight runs of varying lengths, the distance covered being between four and five miles. On the following Monday a number of people assembled by invitation to see some trials with the machine and witnessed two pretty flights. In the first, an oval of about 5 miles round was traversed, at heights varying up to 40 ft., while the subsequent trip was a circular one of 2½ miles over the lake, the altitude ranging up

to 75 feet. The next day the machine was out again, and no difficulty was experienced in rising to a height of 300 ft.

A 50-h.p. Gnome engine is fitted, while the float consists of a three-stepped hydroplane, built by Messrs. Borwick, the framework being of mahogany, and the covering of Willesden canvas.

Mr. Gnosspelius also had his hydro-monoplane out on Saturday week at Cockshot, but the machine had only been going a minute or so when it was caught by a gust of wind, and capsized. The pilot was thrown out, but fortunately escaped with nothing worse than a ducking. The damage to the machine consisted of a broken wing and splintered propeller. This machine, which is the second built by Mr. Gnosspelius, is fitted with a 50-h.p. Clerget engine.



Conducted by V. E. JOHNSON, M.A.

Theory and Practice.

*"It has been found that many model makers fly their machines without the slightest idea of the reason of the flight and this condition the club intends to do their level best to remedy."**

An excellent decision, on which the Liverpool Model Aero Club deserve congratulations. Also, note on the same page, with respect to the Conisborough and District Aeroplane Society, that theoretical tests have already been established. I trust that every other club which has not yet adopted this plan will do so forthwith. No better method could possibly be adopted to build up a *science* of model aeroplaning.

Most assuredly no first-class certificate should be awarded for practical results alone. This supposes, of course, that such results could be obtained by such means, which we much doubt. The theoretical means employed might be indirect ones, founded on the work of others, and copied or embodied in the design because they were found to give better results in practice. The resulting model might differ in certain respects from its prototype, but would certainly not be original, using the word in the sense intended in my former article.

The greatest advances in any art have always been made when theory and practice go hand in hand. In the early achievements of any art, practice always outstrips theory, for until you have, by practice, acquired certain data, you can have no theory. Sound theory is the accumulation of observations and experiments, *i.e.*, of practice until general principles can be deduced, and some new theory be evolved therefrom: and then this new theory becomes the rule and guidance of future practice. It is for this very reason, because the theories of the ancient were *not* so founded, that when the dawn of modern science broke upon the world, they fell.

Theorising upon insufficient data—

"Falls like an inverted cone,

Wanting its proper base to stand upon."

Which is the reason why as data multiply, theories change.

The evidence on which the laws of motion are accepted is the absolute agreement with observed phenomena of calculations, based on the *assumption* of their truth. Probably no law of nature stands on a firmer basis than the conservation of energy, because there is no principle towards the overthrow of which so much ingenuity has been fruitlessly directed, *viz.*, in the search for "perpetual motion"—that something for nothing, which nature will never give us.

If there is a failure in the application of a principle, then there is either some practical error in the application or some flaw in the principle itself, and a design essentially incapable of proving good in practice, cannot with propriety be said to be good in theory.

To say that a thing is good in theory, but bad in practice, is a clear logical fallacy—moreover, it is not true.

There was once a very practical man who decided to build a house—he determined to be his own architect; he knew nothing of the theory of architecture, he said it only wanted common sense, the house was founded, the walls erected, the floors laid one after

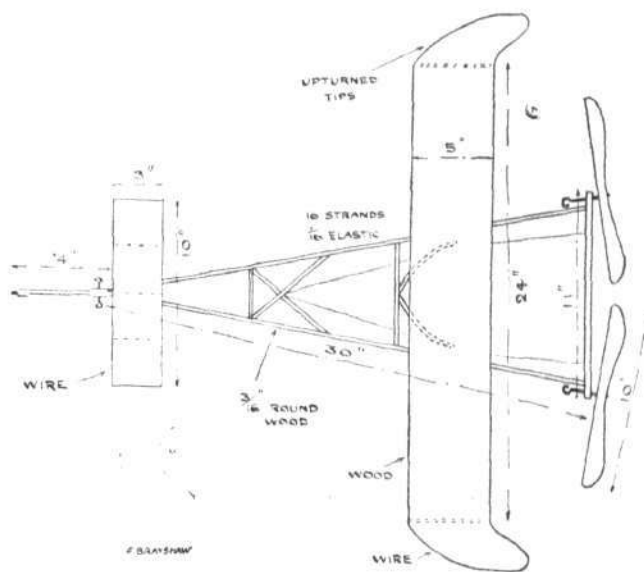
* FLIGHT, Dec. 2nd, 1911, p. 1046.

the other, the windows inserted and the roof completed, the house was finished, and had but this single defect, that to get from the lower floor to the upper there was no staircase. Lifts were not then invented (for this is a very old story, but it illustrates my point).

There are always the two, theory and practice, you cannot have sound theory without practice or the best practice without reliable theory; such being the case let us cultivate both.

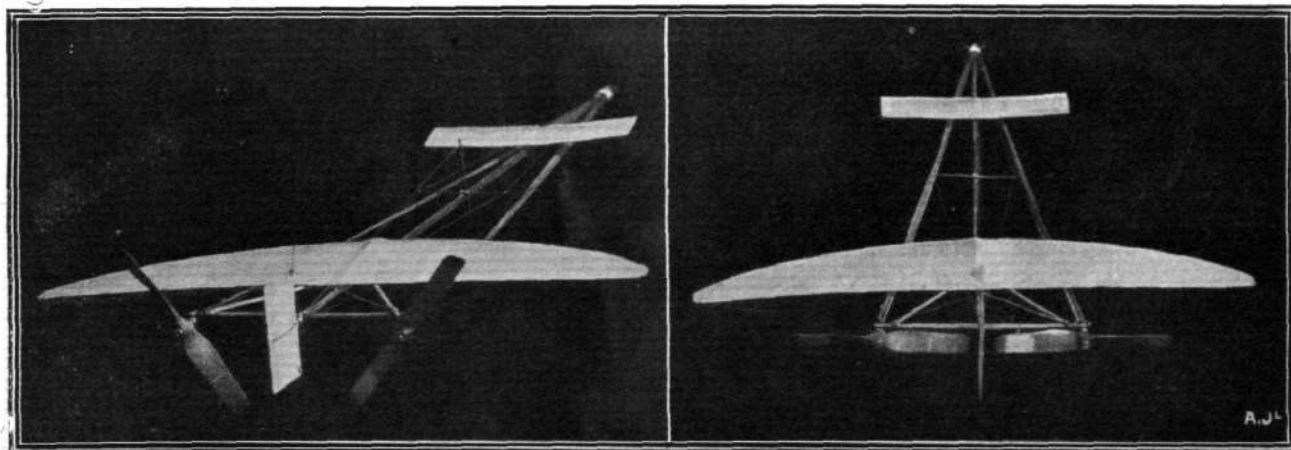
I propose, then, to take each week some specific case and dealing with it, briefly, and in as plain and simple language as possible. My subject next week will be "The Respective Areas of Main Plane and Elevator."

I have before me several articles on "How to Build a Model Aeroplane" (of quite the ordinary type). Before writing on any subject (no matter what its nature) it is advisable to make oneself familiar with what has already been done in the



Model aeroplane, by E. Brayshaw, weighing 7 ounces.

subject—both in magazine and book form. Much disappointment is sure to be averted. Please remember that it is one thing to *build* a successful model, but quite another thing to write about it in such a manner that anyone else (novices included) can do the same thing. For instance, one of my correspondents *does not think it necessary to state a single dimension*, and I never knew anyone yet who could measure



Mr. C. Ian Russell's model. Note the excellent position of the rudder; but the span is excessive.

dimensions accurately from a photograph, some of which they cannot even see. It has been said that photography cannot lie—well, all I can say is that whoever said it didn't know much about photography.

The Kite and Model Aeroplane Association.

The Hon. Secretary of the above Association—Mr. W. H. Akhurst (whose untiring energy and zeal have done so much towards its success)—has sent me particulars with respect to the affiliation of other clubs; the question is one of paramount importance with respect to model aeroplaning. It is most earnestly to be hoped that no club will permit any personal or local circumstances to stand in the way of such affiliation, which in view of any international contest becomes, one might say, of national importance. I regret to have to state that the French have the lead of us even in this matter, and nothing but a united front is at all likely to avert disaster. I refer not to rubber-driven but power-driven models, and an international contest could scarcely be limited to models propelled solely by rubber. Lastly, there is that distinction between an ordinary record and that on which the ball mark of proper official recognition has been set, which makes all the difference—even more so afterwards, perhaps, than at the actual time of the event.

Notes.

I should much like to receive from the Blackheath Aero Club some particulars with respect to the single-tractor screw monoplane mentioned in last week's issue.

There appear to be very great discrepancies in the amount of energy that can be stored up in a pound of rubber. Mr. G. T. R. Hill (letter 1397, October 21st) states, quoting from an old copy of FLIGHT, that $\frac{3}{4}$ lb. of rubber can store upwards of 1,000 ft. lb., which gives us some 1,300 ft. lb. per lb. weight of rubber. Obtaining my information from what I had every reason to think was a reliable source, I have stated it to be 300 ft. lb. The question is of some importance. I should be glad to hear of any really reliable experiments on the matter. I might just mention that with $2\frac{1}{8}$ oz. (36 strands 1 yard each), unlubricated, 200 turns only, I have obtained some 15 ft. lb., 12 oz. being raised 19 ft. in 5 secs. This can plausibly be shown to be in the nature of 300 to 500 ft. lb. so far as actual practice goes.

A correspondent wishes to know where he can purchase plans for building a "Fleming Williams" model. Will some reader kindly supply this information?

E. N. Joyce (St. Margaret's Bay, near Dover), would be glad to know if there is any prospect of a model club being started in that vicinity.

A correspondent from Lincoln states that attempts have been made there to start a model club but failed because Lincolnians say it is only a sport fit for small school boys. Exactly so—Lincoln is not alone in this opinion—this is one of the popular errors that we must all do our best to remove.

Replies in Brief.

C. R. TAYLOR.—Thanks for your letter. It has been thought best to close the discussion—partly for the very reasons you state.

F. PLUMMER—Yes; but what was the type of your propeller, also its pitch, &c.? Moreover, I take it your propeller was rotating only, and not advancing through the air. Full particulars are always necessary, or no correct comparisons can be made.

C. HAY.—You are quite correct as to the efficiency of the propellers you name; reduce their weight by carefully sandpapering, &c., to one half, and you will be still more successful.

S. H. S. M.—It is the dynamic, not the static, thrust of a propeller that we really want to know.

Owing to the great pressure on our columns this week, in connection with the Deputation to the Government, Correspondence and other features are held over.—Ed.

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Catalogue.

List of Books on Aeronautics. Paris: Librairie Aéronautique, 40, rue de Seine.

Modèles d'Aérolanes, Cerfs-Volants, Pièces détachées. L'Aéronautique, 33 rue Madame, Paris.

Etude de la Stabilité de l'Aéroplane. By G. de Bothezat; with a preface by Paul Painlevé. Paris: H. Dunod et E. Pinat, 47-49, quai des Grands-Augustins. Price 10 francs.

Aeronautical Patents Published.

Applied for in 1910.

Published December 7th, 1911.

- 23,776. J. FORMBY. Gun for attacking aerial machines.
26,653. J. NEALE. Testing apparatus.

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- 9,127. A. HORTON. Elevators.
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